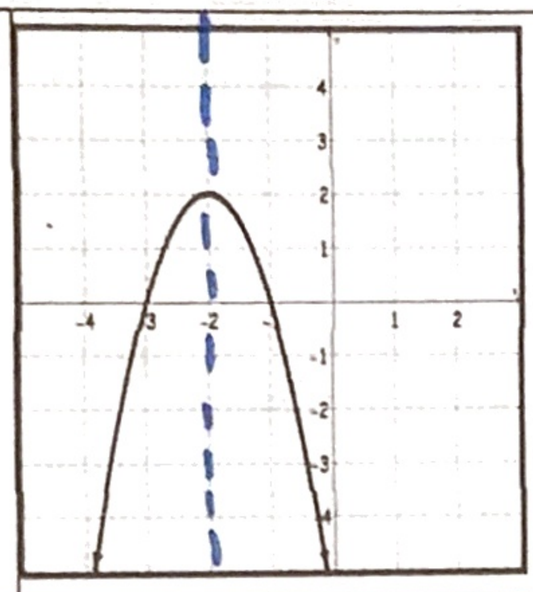
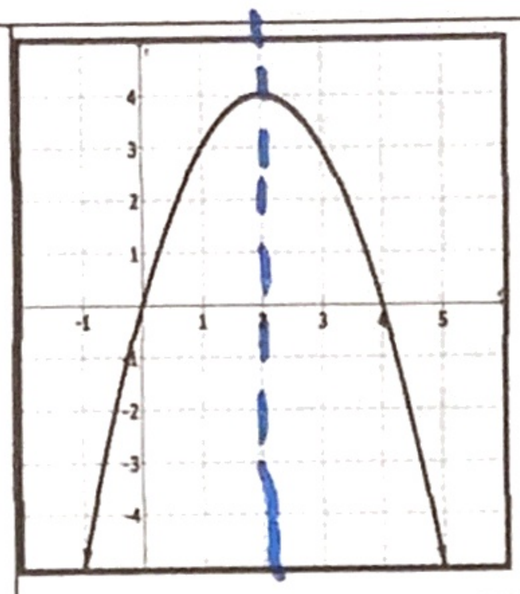
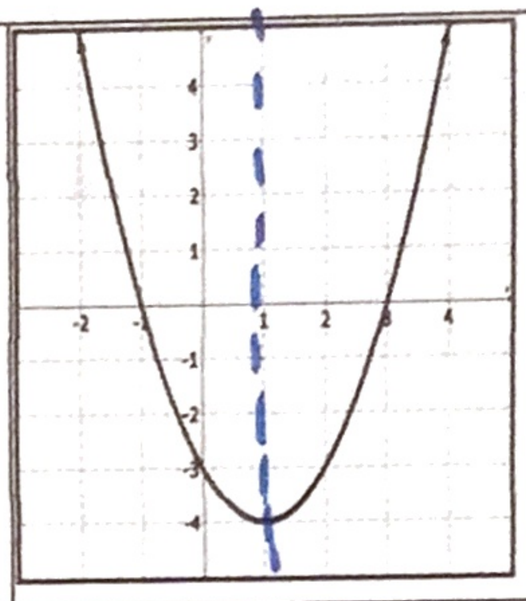
Name: _____ Date: _____ Hour: ____Alg 1____

Unit 7B Day 17: Graphing Standard form of Quadratic Functions

Focus Question: How do I graph from standard form?

A. Graphing from Standard form

1. The value of *c* gives you the y-intercept. The value of *a* tells you about the shape of the parabola, but that's not all! Complete the table below to find how the values of *a* and *b* are related to the axis of symmetry (remember, you no longer have vertex form to help you out with that).

Graph			
Function	$y = -2x^2 - 8x - 6$	$y = -1x^2 + 4x$	$y = x^2 - 2x - 3$
Axis of Symmetry	$x = -2$	$x = 2$	$x = 1$
a	-2	-1	1
b	-8	4	-2
How you think you find the line of symmetry using a and b	$\frac{-(-8)}{2(-2)}$ $\frac{8}{-4}$	$\frac{-4}{2(-1)}$ $\frac{-4}{-2}$	$\frac{-(-2)}{2(1)}$ $\frac{2}{2}$

2. The line of symmetry is always at $x = \frac{-b}{2a}$

3. Find the following for each quadratic: axis of symmetry, vertex, y-intercept, domain, and range.

a) $f(x) = -2x^2 - 16x + 5$

a=-2, b=-16

a.o.s. $x = \frac{-(-16)}{2(-2)}$

$x = \frac{16}{-4}$

$x = -4$

vertex $f(-4) = -2(-4)^2 - 16(-4) + 5$

$= -2(16) + 64 + 5$

$= -32 + 69$

$= 37$

(-4, 37)

yint (0, 5)

$R: (-\infty, 37]$

b) $g(x) = x^2 - 7$

a=1, b=0

yint (0, -7)

a.o.s $x = \frac{-0}{2(1)}$

$x = 0$

vertex (0, -7)

$g(0) = 0^2 - 7$

$= 0 - 7$

$= -7$

(0, -7)

$R: [-7, \infty)$

c) $h(x) = 5x^2 - 20x + 10$

a=5, b=-20

a.o.s. $x = \frac{-(-20)}{2(5)} \rightarrow \frac{20}{10}$

$x = 2$

yint (0, 10)

$h(2) = 5(2)^2 - 20(2) + 10$

$= 5(4) - 40 + 10$

$= 20 - 30$

$= -10$

vertex (2, -10)

(2, -10)

$R: [-10, \infty)$

$D: (-\infty, \infty)$

4. Graph the following quadratic functions: (remember 5 points are required – 2 can be found with symmetry)

a) $f(x) = x^2 - 6x + 4$

a=1
b=-6
y int (0,4)

a.o.s. $x = \frac{-b}{2a} \rightarrow \frac{--6}{2(1)} \rightarrow \frac{6}{2}$

x=3

vertex

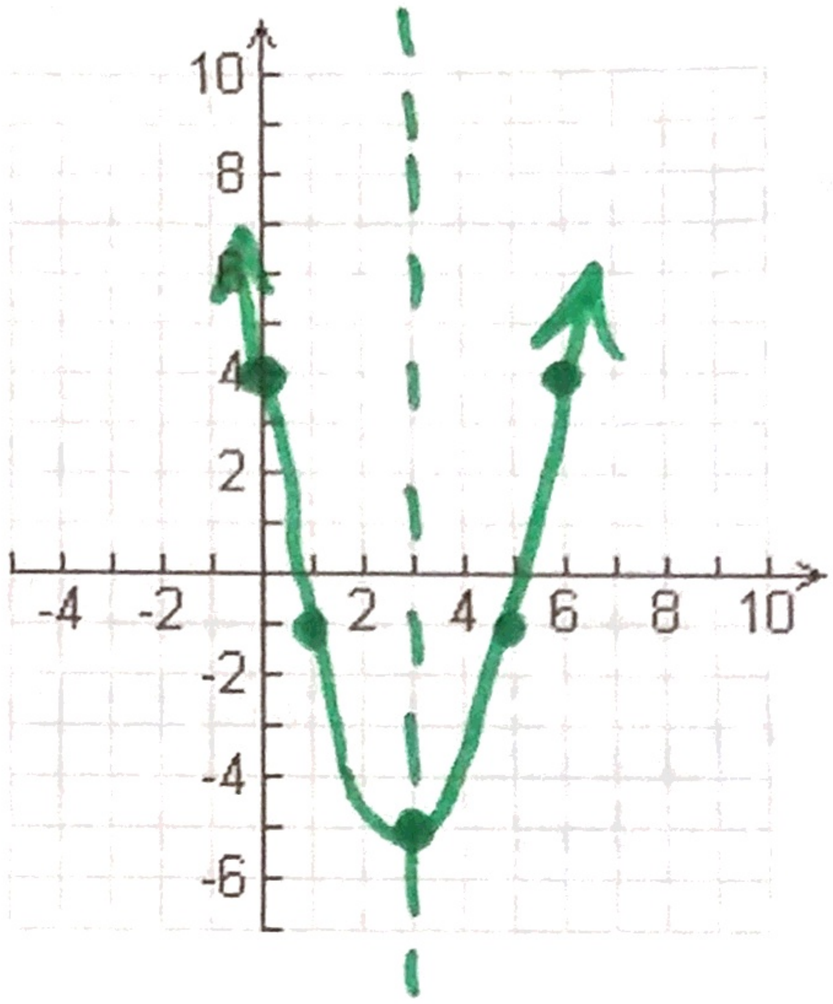
$f(3) = (3)^2 - 6(3) + 4$
$= 9 - 18 + 4$
$= -5$

(3,-5)

additional pt

$f(1) = 1^2 - 6(1) + 4$
$= 1 - 6 + 4$
$= -1$

(1,-1)



b) $f(x) = \frac{1}{4}x^2 + 2x + 1$

a=¼ b=2 y int (0,1)

a.o.s. $x = \frac{-2}{2(\frac{1}{4})} \Rightarrow \frac{-2}{\frac{1}{2}}$ x=-4

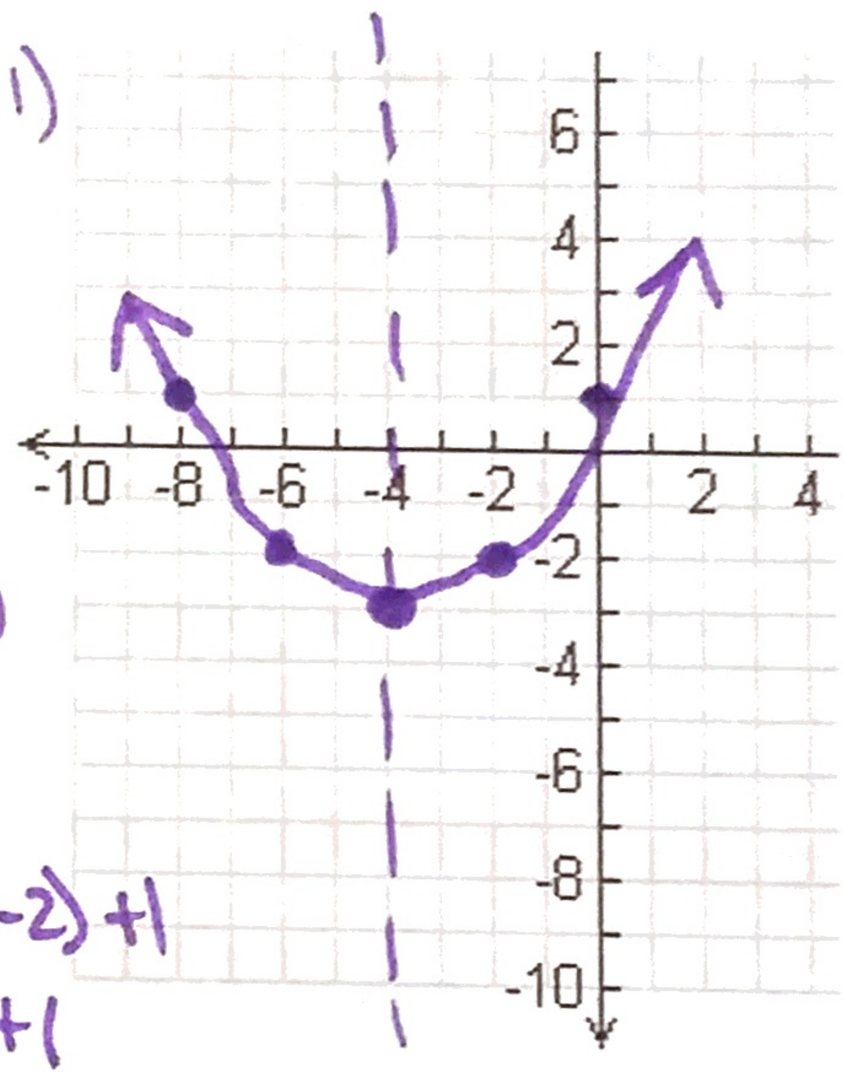
vertex:

$f(-4) = \frac{1}{4}(-4)^2 + 2(-4) + 1$
$= \frac{1}{4}(16) - 8 + 1$
$= 4 - 7$
$= -3$

(-4,-3)

additional pt $f(-2) = \frac{1}{4}(-2)^2 + 2(-2) + 1$
$= \frac{1}{4}(4) - 4 + 1$
$= 1 - 3$
$= -2$

(-2,-2)



c) $f(x) = -\frac{1}{2}x^2 - 2x + 5$

a=-½
b=-2
y int (0,5)

a.o.s. $x = \frac{--2}{2(-\frac{1}{2})} \Rightarrow \frac{2}{-1}$ x=-2

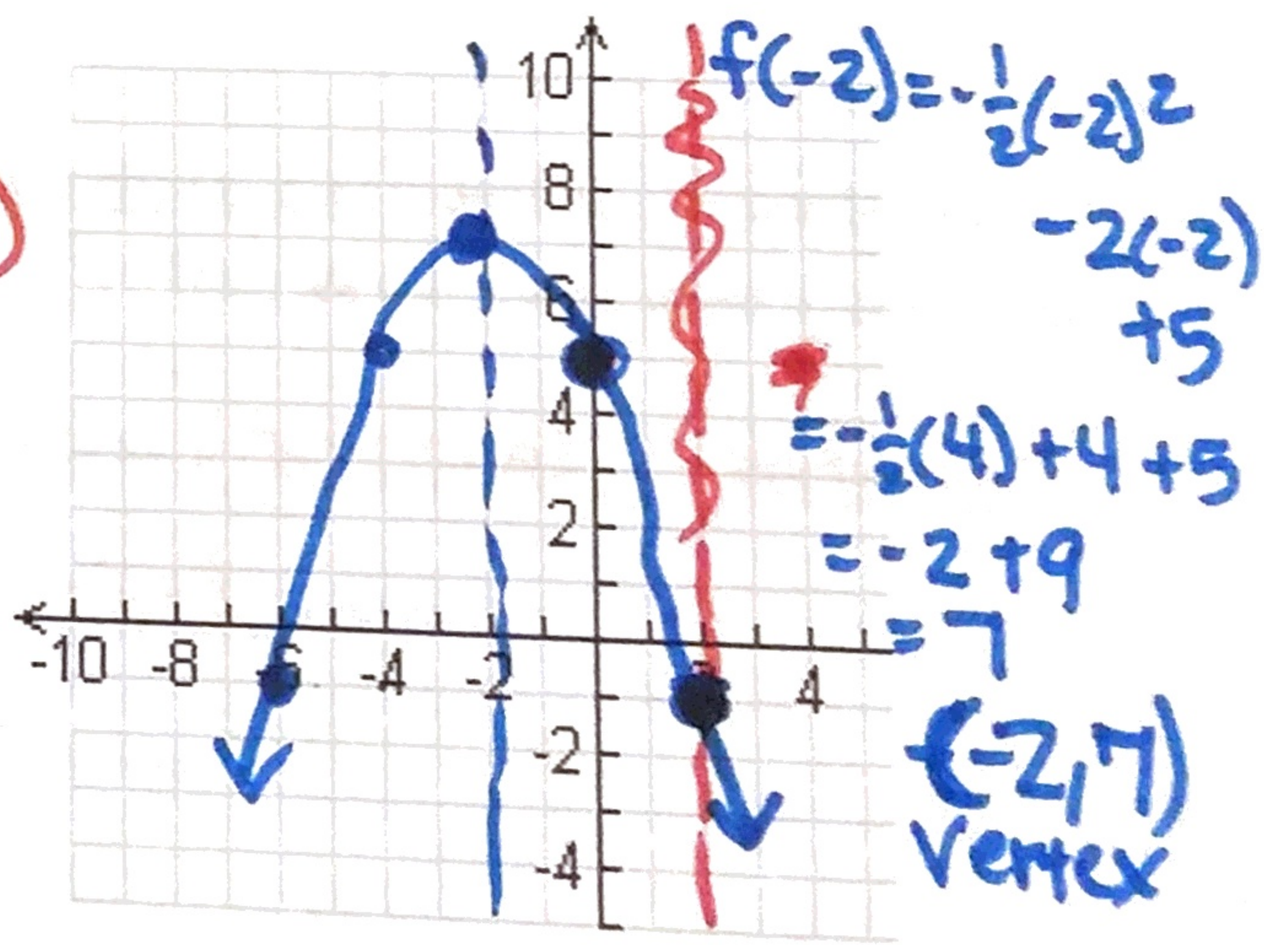
additional pt

$f(-2) = -\frac{1}{2}(-2)^2 - 2(-2) + 5$
$= -\frac{1}{2}(4) + 4 + 5$
$= -2 + 9$
$= 7$

(-2,7) vertex

$f(2) = -\frac{1}{2}(2)^2 - 2(2) + 5$
$= -\frac{1}{2}(4) - 4 + 5$
$= -2 + 1$
$= -1$

(2,-1)



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